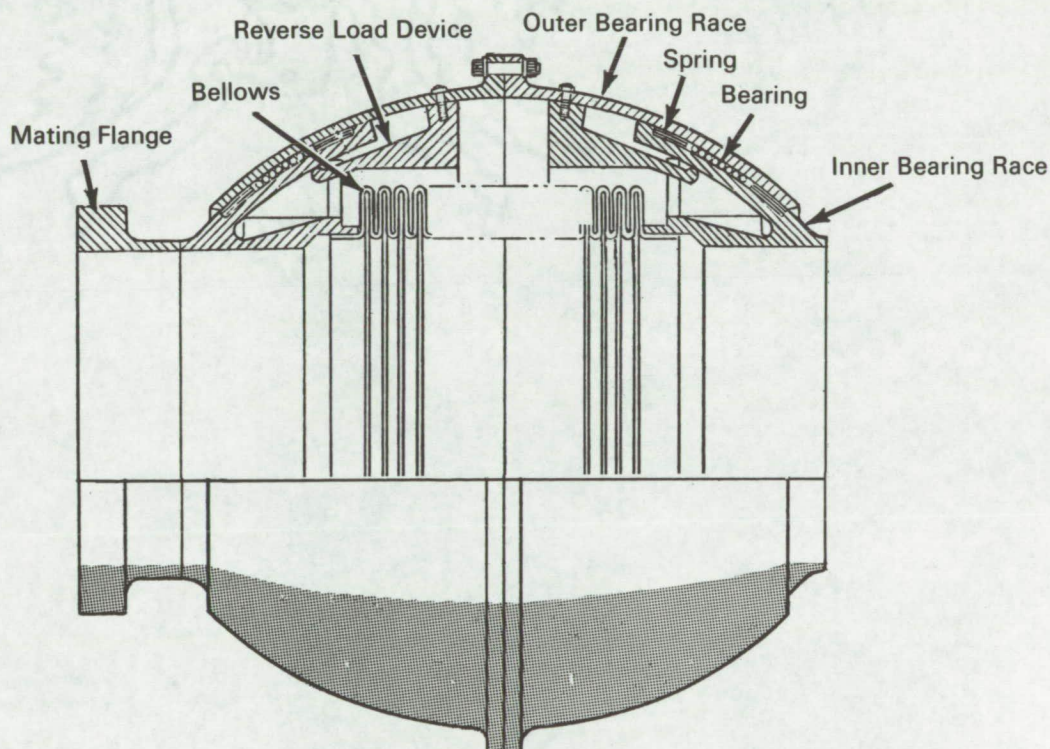


# NASA TECH BRIEF



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## Spherical Pipe Joint Delivers Loads Equally to Mating Flange



### The problem:

To design a large diameter ball joint for an oxidizer inlet duct to transmit an evenly distributed load to the mating flange.

### The solution:

A ball joint pipe fitting incorporating two spherical bearing races and balls in contact with centering cage springs. The centering cage springs enable the bearings to center themselves when the joint is angulated.

### How it's done:

An inner bearing race is slotted to provide a channel wherein a reverse load device having spherical, tipped fingers may move inward while under reverse loads and moving through the angular movement of the ball joint. Curved springs center the ball bearing, preventing its free floating while the ball joint is under the reverse loading condition. The bearing contains 1,728 balls for high thrust loads through a  $\pm 10^\circ$  oscillation at 10 cpm.

(continued overleaf)

**Notes:**

1. This design should find application in piping systems where unequal load distributions exist.
2. Inquiries concerning this invention may be directed to:

Technology Utilization Officer  
Marshall Space Flight Center  
Huntsville, Alabama 35812  
Reference: B66-10665

**Patent status:**

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: Robert O. Pflieger  
of North American Aviation, Inc.  
under contract to  
Marshall Space Flight Center  
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